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Two-level adaptive training branch prediction  
TY Yeh... - Proceedings of the 24th annual international ..., 1991 - dl.acm.org  
... diction schemes were simulated on the SPEC bench- mark suite. By using Two-Level Adaptive Training **Branch Prediction**, the average prediction **accuracy** for the benchmarks reaches 97 percent, while most of the other schemes achieve under 93 percent. ...  
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[PDF] from illinois.edu

Alternative implementations of two-level adaptive branch prediction  
TY Yeh... - ACM SIGARCH Computer Architecture News, 1992 - dl.acm.org  
... tions, and use these costs in evaluating their relative ef- fectiveness. We measure the **branch prediction accuracy** of the three variations of Two-Level Adaptive **Branch Prediction**, along with several other popular proposed dynamic and static prediction schemes, on the SPEC ...  
Cited by 568 - Related articles - SL Direct - All 27 versions

[PDF] from pdx.edu

A study of branch prediction strategies  
JE Smith - 25 years of the international symposia on Computer ..., 1998 - dl.acm.org  
... The least variation was in the ADVAN program in which the counters were virtually always at their maximum values, and hierarchical prediction would have been of no real **value**. ...  
CONCLUSIONS This paper studied the **accuracy** of **branch prediction** methods proposed ...  
Cited by 835 - Related articles - SL Direct - All 42 versions

[PDF] from iastate.edu

Using hybrid branch predictors to improve branch prediction accuracy in the presence of context switches  
M Evans, PY Chang... - ACM SIGARCH Computer Architecture ..., 1998 - dl.acm.org  
... one; otherwise, the **value** is decremented by one. By keeping more history information, a higher **level** of **branch prediction accuracy** can be attained [14]. Yeh and Patt proposed the Two-Level Branch Predictor which uses two levels of history to make branch pre- ...  
Cited by 154 - Related articles - SL Direct - All 20 versions

[PDF] from pku.cn

Improving branch prediction accuracy by reducing pattern history table interference  
PY Chang, M Evans... - International journal of parallel ..., 1997 - Springer  
... To improve prediction **accuracy**, various **branch prediction** strategies have ... The lower bits of the branch address select the appropriate Pattern History Table (PHT) and the **value** in the branch history register (BHR) selects the appropriate 2-bit counter to use within that ...  
Cited by 129 - Related articles - SL Direct - All 15 versions

[PDF] from psu.edu

Improving the accuracy of dynamic branch prediction using branch correlation  
ST Pan, K So... - ACM SIGPLAN Notices, 1992 - dl.acm.org  
... is 2N-1, it remains at that **value** as long as the branch is taken. ... is reported to produce fairly high prediction **accuracy** [10], its hard- actual result: 1=taken, 0=not taken ... our knowledge, very little work has been done in addressing the issue of branch correlation in **branch prediction**. ...  
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[PDF] from u-aizu.ac.jp

Dynamic history-length fitting: a third level of adaptivity for branch prediction  
T Juan, S Sangeevan... - ACM SIGARCH Computer ..., 1998 - dl.acm.org  
... of lost cycles due to speculative execution of wrong-path instruc- tions, **branch prediction** has evolved ... Finally, prediction **accuracy** for gee, go and vorrex improves with more history bits but ... based on the current number of mispredictions and the minimum **value** encountered so far ...  
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[PDF] from psu.edu

Accurate static branch prediction by value range propagation  
JRC Patterson - ACM SIGPLAN Notices, 1985 - dl.acm.org  
... Although these approaches are much better than trivial heuristics, their **accuracy** is still only mediocre. ... There is a **strong** similarity between constant propagation and our ... The objective of any **branch prediction** algorithm is to determine the likelihood of taking each conditional ...  
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[PDF] from lightterra.com

Highly accurate data value prediction using hybrid predictors  
K Wang ... - Proceedings of the 30th annual ACM/IEEE ..., 1997 - dl.acm.org  
... ructural hazards and increased execution time [9]. In this section, we describe techniques that substantially improve the **accuracy** of data ... However, it is not possible to directly apply these techniques to data **value** prediction, because **branch prediction** involves merely a ...  
Cited by 334 - Related articles - SL Direct - All 20 versions

[PDF] from psu.edu

[PDF] Combining branch predictors  
S McFarling - 1993 - utdallas.edu  
... to both distinguish which of the two branches is being executed and what the current **value** of j ... Thus, the prediction **accuracy** here would be as good as that of local prediction. Figure 7 compares the performance of the global prediction with local and bimodal **branch prediction**. ...  
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... The link between changes in **branch misprediction** rate and changes in performance has been well documented [ ... that a two-**level** branch predictor can achieve high levels of branch prediction **accuracy** [4]. In ... The first **level** function was originally the **value** of an N-bit shift register ... Cited by 164 - Related articles - BI Direct - All 19 versions

IPDF1 from osu.edu

J. González... : ... of the 12th international conference on ... 1995 - dl.acm.org

... This particular benchmark has the highest **branch misprediction** rate, and its performance seems to be determined by such branches. ... G. Tyson and T Austin. "Improving the **Accuracy** and Per ... "Highly Accurate Data **Value** Prediction using Hybrid Predictors". In Proc. of Int. Symp. ...  
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PDF from [livermore.org](http://livermore.org)

Y. Hwang, S. Abdi... - Proceedings of the conference on Design, ... 2008 - dl.acm.org

... Speed and **accuracy** are natural concerns ... basic block on the execution model in the PUM while assuming optimistic cache behavior of 100% hit rate and no **branch misprediction**. ... returns the set of operations that are in their last stage and have remaining cycle counter **value** of 0 ...

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IPDF1 from psu.edu

B Calder, G Reinman, ... - 1999, Proceedings of the ... 1999 - [explore.1999.org](http://www.explore.1999.org)

... lection of a fault, TLB miss, **branch misprediction**, or load misspeculation. ... prediction entry in the **value** table contains an N-bit history register, keeping track of the **accuracy** of the ... makes will most likely be incorrect, and the confidence counter will end up set to a **strong** not predict ...

Cited by 222 - Related articles - EIL Direct - All 33 versions

PDF from ieeta.pt

CC Lee, CK Chen... - ... 1997. Proceedings... Thirtieth ... 1997 - [ieeexplore.ieee.org](http://ieeexplore.ieee.org)

... for each benchmark, we present results using the configuration that yields the best **accuracy** for the ... In Figure 2, the vertical axis represents the **branch misprediction** rate, and the horizontal axis ... Ideally, the index should generate highly biased substreams so that the **value** of the ...

Cited by 209 - Related articles - EIL Direct - All 30 versions

[PDF] from umich.edu

E. Larson, ... - Proceedings of the 33rd annual ACM/IEEE ... 2000 - dl.acm.org

... a function of this critical path metric, optimization frequency, and optimization **accuracy**. ... to the fixup code where the computation proceeds with the non-speculative **value**. ... This approach introduces unnecessary **branch misprediction** when the branch predictor directs instruction ...

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IPDF1 from dsu.edu

K. Orlsen, - Proceedings of the 31st annual ACM/IEEE ..., 1998 - dl.acm.org

... branches, we believe that it could also improve conditional branch prediction and **value** prediction, ... a total of 288 prediction table entries achieves virtually the same prediction **accuracy** as the ... Interference for 24-bit pattern Table 2. Indirect **branch misprediction** causes for a BTB ...

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[PDF] from utah.edu

DA Jiménez - ... - 2003, MICRO-36, Proceedings, 36th Annual ... 2003 - [ieeexplore.ieee.org](http://ieeexplore.ieee.org)

... **Branch misprediction** latency is the most important component of performance degradation as microarchitectures become ... a prediction is needed, the weights vector corresponding to that value of  $xy$  ... of  $qrv$ , they can be bitwise complemented with very little impact on accuracy. ...

Cited by 102 - Related articles - BL Direct - All 46 versions

[PDF] from psu.edu

S. Manne, A. Klausner, ... - ACM SIGARCH Computer ..., 1998 - dl.acm.org

... by running the program through a branch prediction simulator and recording the **branch misprediction** rate of ... The results for McFarling with JRS are similar to those using the "Both Strong" estimator. ... far less expensive to target a high SPEC value and increase the **accuracy** of the ...

Cited by 455 · Related articles · BL Direct · All 43 versions

[PDF] from rit.edu

P. Michaud, A. Szepes... - ACM SIGARCH Computer Architecture ..., 1997 - dl.acm.org

... Recent studies have shown that large or multi-process workloads with a **strong** OS component ... we quantify aliasing and assess the effect of conflict aliasing on overall branch-prediction **accuracy**. ... bits and global history bits are XORed together to form an index **value**, whereas in ...

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Analysis of branch prediction via data compression

I Chen, K Cheng, JT Colley... - ACM SIGOPS Operating ... , 1996 - dl.acm.org

... predictors in Section 3.1.1, it can be seen that there are **strong** similarities. ... eg, knowledge about the program exe- cuting) can always be used to improve the prediction **accuracy**. ... The vertical axis indicates **branch misprediction** rate, and the horizontal axis indicates the size of pre ...

Cited by 126 - Related articles - BL Direct - All 17 versions

[PDF] from umich.edu

Trading conflict and capacity aliasing in conditional branch predictors

P Michaud, A Szegner... - ACM SIGARCH Computer Architecture ... , 1997 - dl.acm.org

... Recent studies have shown that large or multi-process workloads with a **strong** OS component exhibit very high degrees of aliasing [11, 51], and require much larger predictor tables than previously ... In last two of Table The 2-bit counter gives prediction **accuracy** an unaliased ...

Cited by 185 - Related articles - BL Direct - All 27 versions

[PDF] from rit.edu

Completion time multiple branch prediction for enhancing trace cache performance

R Raskvic, B Black... - ACM SIGARCH Computer Architecture ... , 2000 - dl.acm.org

... The experimental data implies that there is **strong** path locality, and that the example shown in ... The TMP performs multiple branch prediction relying on the **accuracy** of individual tree-node ... with the oldest completed block not in the previous trace, or after a **branch misprediction** ...

Cited by 34 - Related articles - BL Direct - All 13 versions

[PDF] from pku.cn

Fast path-based neural branch prediction

DA Jiménez - ... , 2003. MICRO-36. Proceedings. 36th Annual ... , 2003 - ieeeexplore.ieee.org

... **Branch misprediction** latency is the most important com- ponent of performance degradation as microarchitectures ... Sec- ond, **accuracy** is improved because the predictor incorpo- rates path information into ... weights are kept closest to the logic that computes the **final** qrv value for ...

Cited by 102 - Related articles - BL Direct - All 46 versions

[PDF] from utah.edu

The bi-mode branch predictor

CC Lee, JCK Chen... - ... , 1997. Proceedings., Thirtieth ... , 1997 - ieeeexplore.ieee.org

... outcome but the selected counter of the direction predictors makes a correct **final** prediction ... each benchmark, we present results using the configuration that yields the best **accuracy** for the ... In Figure 2, the vertical axis represents the **branch misprediction** rate, and the hori- zontal ...

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Selective value prediction

B Calder, G Reinman... - ... , 1999. Proceedings of the ... , 1999 - ieeeexplore.ieee.org

... tfection of a fault, TLB miss, **branch misprediction**, or load misspeculation. ... prediction entry in the value table contains an N-bit history register, keeping track of the **accuracy** of the ... makes will most likely be incorrect, and the confidence counter will end up set to a **strong** not predict ...

Cited by 222 - Related articles - BL Direct - All 33 versions

[PDF] from psu.edu

Improving branch prediction by dynamic dataflow-based identification of correlated branches from a large global history

R Thomas, M Franklin, C Wilkerson... - ACM SIGARCH Computer ... , 2003 - dl.acm.org

... [6] went one step further, and showed that for 16-bit histories, the prediction **accuracy** is not ... the next branch, all registers that get updated in that basic block will have the last branch marked as ... **branch misprediction** is detected, speculative updates to the ARF have to be repaired. ...

Cited by 44 - Related articles - BL Direct - All 19 versions

[PDF] from uconn.edu

Variable length path branch prediction

J Stark, M Evers... - ACM SIGOPS Operating Systems Review, 1998 - dl.acm.org

... into the table using the last N target addresses, and using profiling information to select the proper value of N for each branch, extremely accurate ... For comparison, the gshare predictor, a predictor known for its high **accuracy**, has a conditional **branch misprediction** rate of 8.8 ...

Cited by 76 - Related articles - BL Direct - All 6 versions

The effects of predicated execution on branch prediction

GS Tyson - Proceedings of the 27th annual international ... , 1994 - dl.acm.org

... prediction schemes range in **accuracy** (and complexity) from simple static techniques exhibiting moderate **accuracy** (m 609ZO) to ... approach has an associated **branch misprediction** ... The **final** branch prediction strategy modeled is the two level adaptive strategy developed by Yeh ...

Cited by 79 - Related articles - All 17 versions

[PDF] from psu.edu

Decoupled value prediction on trace processors

SJ Lee, Y Wang... - High-Performance Computer ... , 2000 - ieeeexplore.ieee.org

... to be delivered to the VPB even if the trace fetch is stalled due to a trace cache miss, a **branch misprediction** or an ... measure the performance based on the prediction **accuracy**, not the prediction rate because it is the prediction **accuracy** which affects the **final** performance. ...

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http://scholar.google.com/scholar?q=%22branch+ misprediction%22+%2B+%28strong+ OR+ accuracy%29+%2B+ final&hl=en&as\_sdt=0%2C47[6/3/2012 9:45:57 PM]

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Articles	<p><b><u>A study of branch prediction strategies</u></b> [PDF] from iastate.edu</p> <p>JE Smith - 25 years of the international symposia on Computer ... , 1998 - dl.acm.org</p> <p>... Our study begins in the next section, with two <b>branch prediction</b> strategies that are often suggested. ... belonging to each of the categories are discussed, and further refinements intended to reduce cost and increase <b>accuracy</b> are presented ... Conclusions are given in the <b>final</b> section ...</p> <p>Cited by 835 - Related articles - BL Direct - All 42 versions</p>
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	<p><b><u>Alternative implementations of two-level adaptive branch prediction</u></b> [PDF] from pdx.edu</p> <p>TY Yeh... - ACM SIGARCH Computer Architecture News, 1992 - dl.acm.org</p> <p>... <b>Prediction</b>) that achieves substantially higher <b>accuracy</b> than any other scheme reported in the literature. The mechanism uses two levels of branch history information to make predictions, the history of the last k branches encountered, and the branch behavior for the last s oc ...</p> <p>Cited by 565 - Related articles - BL Direct - All 27 versions</p>
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	<p><b><u>Improving the accuracy of static branch prediction using branch correlation</u></b> [PDF] from psu.edu</p> <p>C Young... - ACM SIGPLAN Notices, 1994 - dl.acm.org</p> <p>... algorithm walks each individual branch history tree to determine the minimum number of unique paths necessary to maximize this <b>branch's prediction accuracy</b>. ... history__ tree_node htnode) BEr31N IF htnode has no children THEN IF path ending at htnode causes <b>final</b> branch to ...</p> <p>Cited by 131 - Related articles - BL Direct - All 37 versions</p>
	<p><b><u>Analysis of branch prediction via data compression</u></b> [PDF] from umich.edu</p> <p>I Chen, K Cheng, JT Coffey... - ACM SIGOPS Operating ... , 1996 - dl.acm.org</p> <p>... Different mappings often have great influ- ence on the <b>final</b> prediction <b>accuracy</b>. ... Among the various <b>branch prediction</b> schemes, two-level or correlation based predictors are among the best ... one on Markov predictors in Section 3.1.1, it can be seen that there are <b>strong</b> similarities ...</p> <p>Cited by 125 - Related articles - BL Direct - All 17 versions</p>
	<p><b><u>Branch predictor with serially connected predictor stages for improving branch prediction accuracy</u></b></p> <p>S McFarling - US Patent 6,374,349, 2002 - Google Patents</p> <p>... This second array of counters switches between the two predictors to select one 50 for a <b>final</b> prediction. ... SUMMARY OF THE INVENTION The invention provides an improved <b>accuracy branch prediction</b> mechanism to minimize the time lost to erroneous 50 predictions that ...</p> <p>Cited by 53 - Related articles - All 4 versions</p>
	<p><b><u>Elastic history buffer: A low-cost method to improve branch prediction accuracy</u></b> [PDF] from psu.edu</p> <p>MD Tariescu, KB Theobald... - Computer Design: VLSI in ... , 1997 - ieeeexplore.ieee.org</p> <p>... This section describes the Elastic History Buffer (EHB) <b>branch prediction</b> scheme. ... Finally, branches which are both <b>strong</b> d and uncorrelated may dispense with dynamic pre ... We can see that, on aver- age, the prediction <b>accuracy</b> of our scheme is within 0.5% of the upper bound ...</p> <p>Cited by 25 - Related articles - All 12 versions</p>
	<p><b><u>A comparison of dynamic branch predictors that use two levels of branch history</u></b> [PDF] from psu.edu</p> <p>TY Yeh... - ACM SIGARCH Computer Architecture News, 1993 - dl.acm.org</p> <p>... We [1] intro- duced the idea of dynamically collecting two levels of branch history, branch execution history and pattern history, to achieve substantially higher <b>accuracy</b> than ... our algorithm Two-level Adaptive <b>Branch Prediction</b>. ... last k branches encountered. ...</p> <p>Cited by 430 - Related articles - BL Direct - All 42 versions</p>
	<p><b><u>Dynamic history-length fitting: a third level of adaptivity for branch prediction</u></b> [PDF] from psu.edu</p> <p>T Juan, S Sanjeevan... - ACM SIGARCH Computer ... , 1998 - dl.acm.org</p> <p>... of lost cycles due to speculative execution of wrong-path instruc- tions, <b>branch prediction</b> has evolved ... Finally, prediction <b>accuracy</b> for gee, go and vorrex improves with more history bits but quickly ... number of mispredictions that occurred the last inter- val when a history length of n ...</p> <p>Cited by 137 - Related articles - BL Direct - All 33 versions</p>
	<p><b><u>Completion time multiple branch prediction for enhancing trace cache performance</u></b> [PDF] from pku.cn</p> <p>R Rakvic, B Black... - ACM SIGARCH Computer Architecture ... , 2000 - dl.acm.org</p> <p>... The experimental data implies that there is <b>strong</b> path locality, and that the example shown in Figure 5 is rather unusual and not the common case. 11 11 ... The TMP performs multiple <b>branch prediction</b> relying on the <b>accuracy</b> of individual tree-node predictors. ...</p> <p>Cited by 34 - Related articles - BL Direct - All 13 versions</p>

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E. Rotenberg, G. Jacobson, ... Thirtieth Annual IEEE ..., 1997 - [ieeexplore.ieee.org](http://ieeexplore.ieee.org)  
 ... The result may be a local **value** only, a live-cut **value** only, or both; in any case ... Global result buses  
 correspond directly with write ports to the global **register** file, and are charac ... In a conventional  
 processor, a **branch misprediction** causes all subsequent instructions to be squashed ...

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... When an instruction uses a predicted **value**, its own **register** entry is also marked as speculative, and its ... Simulation is execution-driven, including execution down any speculative path until the de-tection of a fault, TLB miss, **branch misprediction**, or load misspeculation. ...

□ include citations

... ii] Patent Number: [45] Date of Patent: 5,758,112 May 26, 1998 [54] PIPELINE PROCESSOR WITH ENHANCED METHOD AND APPARATUS FOR RESTORING REGISTER-RENAMING INFORMATION IN THE EVENT OF A **BRANCH MISPREDICTION** [75] Inventors: Kenneth C. ...  
Cited by 42 · Related articles · All 2 versions

... the present invention relates to a method and system for executing instructions within a processor such that the **branch misprediction** penalty incurred ... In some cases, the condition **register value** upon which a conditional branch depends can be ascertained prior to executing the ...

... For comparison, the gshare predictor, a predictor known for its high accuracy, has a conditional **branch misprediction** rate of 8.8% given the ... branch.) At the end of the second step, the **final** candidate that is selected for each branch is the candidate ... **register value** must be used. ...

Cited by 76 · Related articles · BI Direct · All 8 versions

[PDF] from cmu.edu

TH Hall, Z Smith, ... Microarchitecture 1999, MICRO- ..., 1999 - [ieeexplore.ieee.org](http://ieeexplore.ieee.org)  
 ... After a **branch misprediction**, the count for each squashed branch is decremented. ... it stores its  
 set difference in the table, and sets the valid bit for the output architectural **register**. ... with the  
 SimpleScalar 2.0 suite [2], modified to simulate the Bi-Mode predictor, the **value** history table ...  
 Cited by 72 · Related articles · All 26 versions

... The **branch misprediction** is high be- cause the branch condition depends on table values, even though for ... Then, each time a tagged instruction is decoded, the instructions pro- ducing its **register** operands, ie, the ... We need to pre- dict at iteration i the **value** of the operands of the ...

Cited by 67 · Related articles · EL Direct · All 14 versions

[PDF] from [purdue.edu](http://purdue.edu)

... Rename Issue Bypasses **Branch misprediction** penalty Bypass check ... However, as in a conventional pipeline, the bypass control logic determines that the operand should come from bypass and discards the **register value**. This lost opportunity is insignificant in practice. ...

... as well as the new physical **register** (new PREG) which will contain the new **value** for the ... to copy said shadow state to said primary state in response to a **branch misprediction** 40 being ... array and said shadow array, said history buffer to store historical physical **register** to logical ...

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... In the case of a **branch misprediction**, dispatch and execution resumes with the proper instruction stream. ... For a conditional branch instruction in the dispatch buffer whose condition depends on the **value** of the **Count Register**, the prediction is **rn** based on the **Count Register value**. ...

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On embedding a microarchitectural design language within Haskell

J Launchbury, JR Lewis... - ACM SIGPLAN Notices, 1999 - dl.acm.org

... At a **branch misprediction, register** mapping tables must be modified to invalidate the contents of registers that contain results of rescinded instructions. ... Without strictness, the **final value** would simply be returned, with none of the effects having been performed. ...

Cited by 49 - Related articles - BL Direct - All 15 versions

Low-overhead core swapping for thermal management

E Kursun, Q Razouman, S Sah, A Shayesteh... - Power-Aware ... - 2005 - Springer

... The mechanism stays active until the die temperature drops below the critical **value**. ... The address predictors are moved further away from the core pipeline in the microcore. There is also a hybrid **value** predictor [24], predicting only load instructions. ...

Cited by 16 - Related articles - BL Direct - All 17 versions

Method and system for changing the executable status of an operation following a branch misprediction without refetching the operation

M Alsop... - US Patent 7,197,630, 2007 - Google Patents

Page 1: US007197630B1 (12) United States Patent ao) Patent no.: us 7,197,630  
bi Alsop et al. (45) Date of Patent: Mar. 27,2007 (54) METHOD AND SYSTEM FOR  
CHANGING THE EXECUTABLE STATUS OF AN OPERATION ...

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Evaluation of Core Technology

J Launchbury, JR Lewis... - 2000 - DTIC Document

... At a **branch misprediction, register** mapping tables must be modified to invalidate the contents of registers that contain results of rescinded instructions. The contents of registers that are possibly live must be preserved until after the branch has ... Without strictness, the **final value** ...

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System and method of implementing microcode operations as subroutines

M Alsop... - US Patent 7,694,110, 2010 - Google Patents

... PUSHA instruction specifies that eight general 30 purpose x86 registers be pushed onto a stack defined by the **value** in the ... In response to detecting the **branch misprediction, register** names within one or more operations included in the first microcode subroutine may be ...

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Dependency table for reducing dependency checking hardware

MS Chinnakonda, TM Tran... - US Patent 6,249,862, 2001 - Google Patents

Cited by 32 - Related articles - All 2 versions

Dependency table for reducing dependency checking hardware

MS Chinnakonda, TM Tran... - US Patent 6,198,769, 2000 - Google Patents

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(book) Exploiting short-lived values for performance and energy efficiency in high performance microprocessors

D Balkan - 2007 - books.google.com

... **Register** renaming is used to overcome false data dependencies, by mapping each dynamic instance of an ... entry indicates if the corresponding **value** is speculatively produced, or if the **value** is a ... the RF to writeback the results values they produced, and at the **final** pipeline stage ...

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http://scholar.google.com/scholar?q=%22branch+ misprediction+ register%22+%2B+%28value+ OR+ final%29&hl=en&as\_sdt=0%2C47[6/3/2012 9:48:20 PM]